<table>
<tr><td>Course title</td><td colspan="5">Selective Project (2): Data acquisition & data handling; Biostatistics</td></tr>
<tr><td>Course code</td><td colspan="5">GEMD-P002</td></tr>
<tr><td>Course type</td><td colspan="5">Required</td></tr>
<tr><td>Level</td><td colspan="5">Undergraduate</td></tr>
<tr><td>Year / Semester</td><td colspan="5">Year 1, Semester 2</td></tr>
<tr><td>Teacher’s name</td><td colspan="5">Dr Nicoletta Nicolaou</td></tr>
<tr><td rowspan="3">ECTS</td><td rowspan="3">4</td><td colspan="4">Teaching Periods per Week</td></tr>
<tr><td>Large Group Learning</td><td>Small Group Learning</td><td>Laboratories & Skills</td><td>Clinical Practice</td></tr>
<tr><td>1</td><td>1-2</td><td>1-2</td><td>0</td></tr>
<tr><td>Course purpose and objectives</td><td colspan="5">The aim of the hands-on, skills-based projects is to enable the students to develop a well-rounded understanding of the processes, methodologies and procedures that govern the collection, handling and analysis of data related to medicine, neurophysiology and health.
By the end of the projects, students will be able to:
• Understand the main categorisations of data types (qualitative, quantitative)
• Describe the main types of research studies
• Understand the significance of ethical issues in research and data collection / handling (anonymity, consent)
• Develop research hypotheses and identify appropriate data collection types / methods
• Understand basic data analysis methodologies and data descriptives
• Understand the basic requirements for creating a Data Management Plan
• Understand the use of technology in the collection, handling, maintenance and analysis of medical / neurophysiological / health data</td></tr>
<tr><td>Learning outcomes</td><td colspan="5">At the end of the projects the student will be able to:

1. Estimate basic data descriptives
2. Compare and contrast different types of study design
3. Understand and discuss the main ethical issues of confidentiality, consent, and anonymity in data collection
4. Prepare comprehensive Data Management Plans
5. Identify appropriate statistical significance tests
6. Perform and interpret hypothesis testing
7. Perform, and interpret the results of, statistical significant testing
8. Summarise data numerically and graphically in Excel and/or SPSS and/or Matlab
9. Discuss the role of technology in data collection, analysis and handling
10. Organise data visually</td></tr>
<tr><td>Prerequisites</td><td colspan="2">None</td><td>Required</td><td colspan="2">None</td></tr>
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<tr><td>Course content</td><td>

Introduction to evidence-based medicine
Types of study design (e.g. randomized controlled trial, cohort studies, observational Vs interventional)
Data Management Plan (DMP)
Data collection methods (questionnaires, electrophysiological measures, patient notes)
Types of data (qualitative, quantitative)
Data handling issues (anonymity, confidentiality, storage, security, sharing, data / sample destruction)
Data analysis methods (summary measures for grouped data, distributions, time-series analysis, scatterplots, correlation, linear regression, public health-related measures)
Machine Learning and Artificial Intelligence data analysis methods
Hypothesis testing and statistical significance methods (t-test, ANOVA, non-parametric tests)
Implementation and application of data analysis methods and statistics (Excel, SPSS, Matlab)
Effective data display for improved comprehension

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<tr><td>Teaching methodology</td><td>Lectures – maximum one-hour p/week
Tutorials / workshops – small group sessions, maximum 3 hours p/week
Student centered learning/self-study, maximum 3 hours p/week</td></tr>
<tr><td>Bibliography</td><td>Recommended textbooks/reading
<table>
<tr><th>Authors</th><th>Title</th><th>Edition</th><th>Publisher</th><th>Year</th><th>ISBN</th></tr>
<tr><td>WL Hurley, CR Denegar, J Hertel</td><td>Research Methods – A framework for Evidence-Based Clinical Practice</td><td>1st</td><td>Lippincott Williams & Wilkins</td><td>2011</td><td>9780781797689</td></tr>
<tr><td>Amit Kaura, Darrel Francis, Shreelata T Datta, Philip Xi</td><td>Crash Course Medical Research, Audit and Teaching: the Essentials for Career Success</td><td>2nd</td><td>Elsevier Ltd</td><td>2019</td><td>9780702073786</td></tr>
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<tr><td>Assessment</td><td>The course will be assessed at the end of Semester 2 with a Summative Assessment comprising the submission of a research poster.
Formative assessment will include submission of worksheets following the workshops / tutorials.</td></tr>
<tr><td>Language</td><td>English</td></tr>
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